

FIG. 1

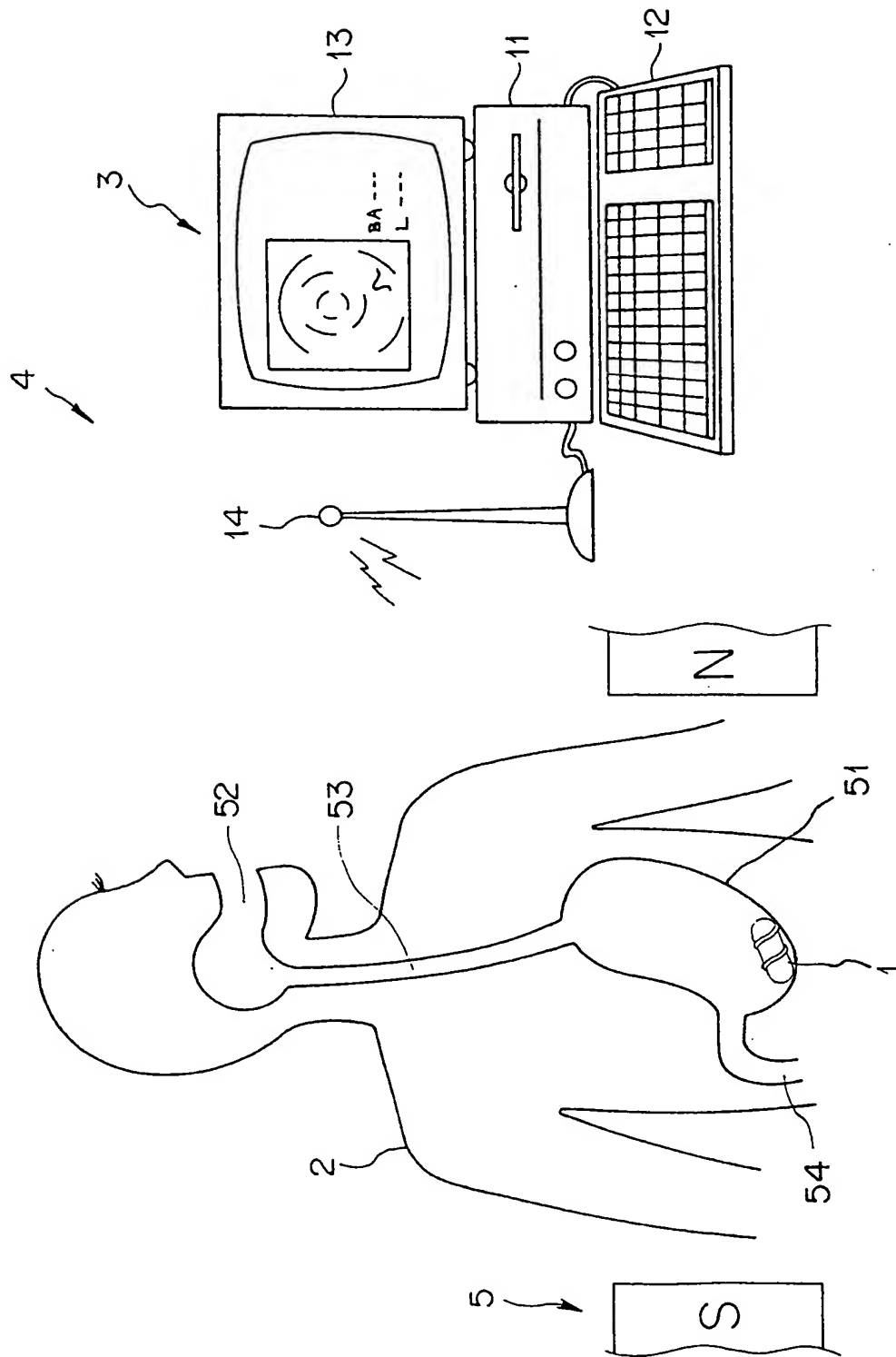


FIG.2

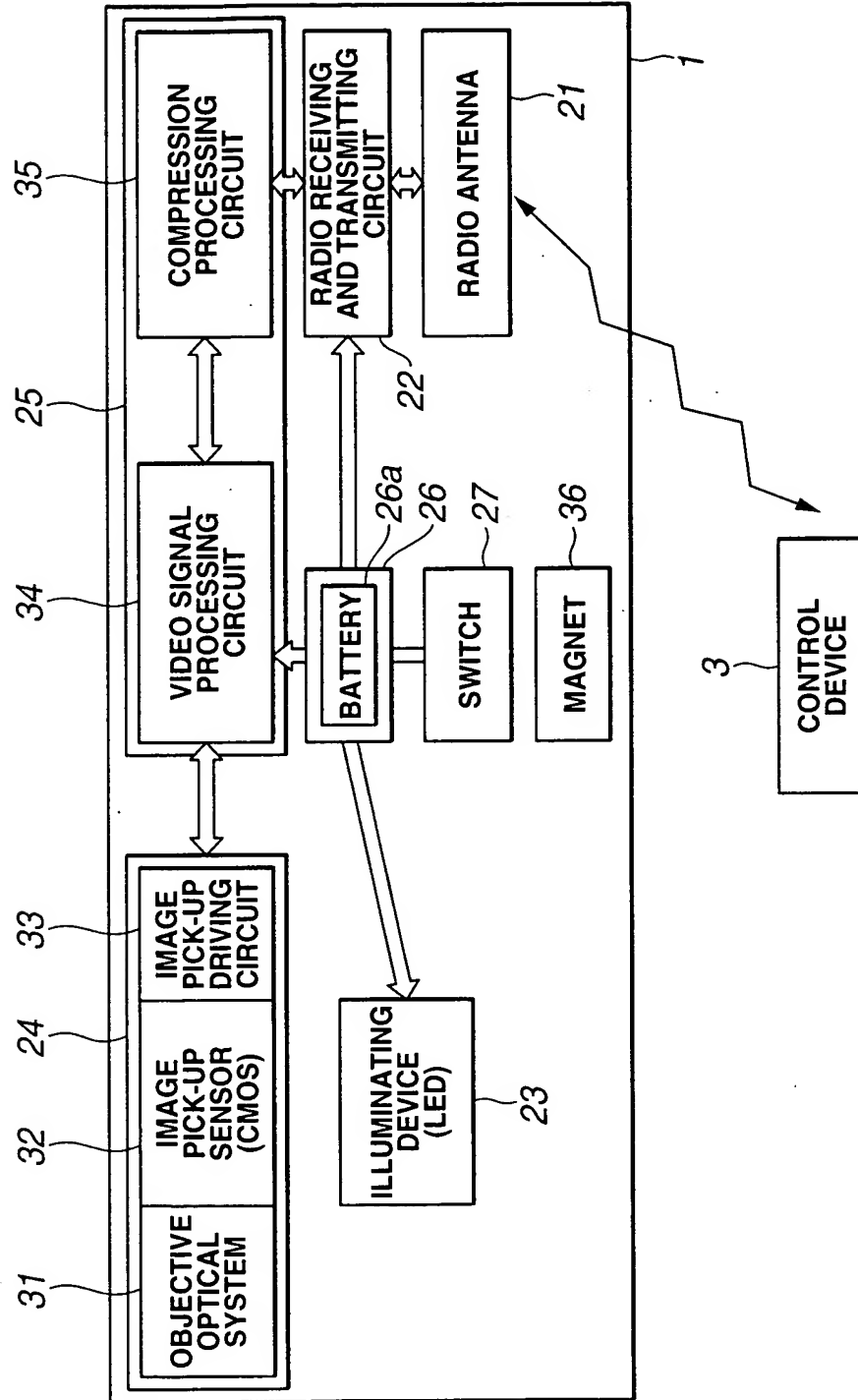


FIG.3B

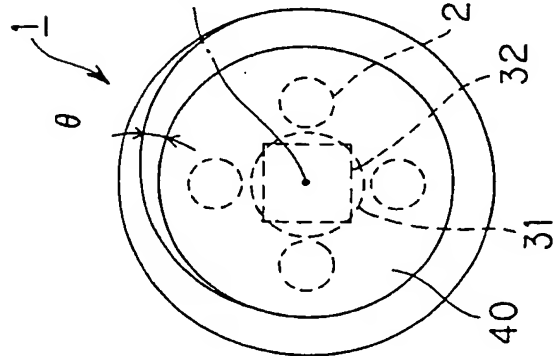


FIG.3A

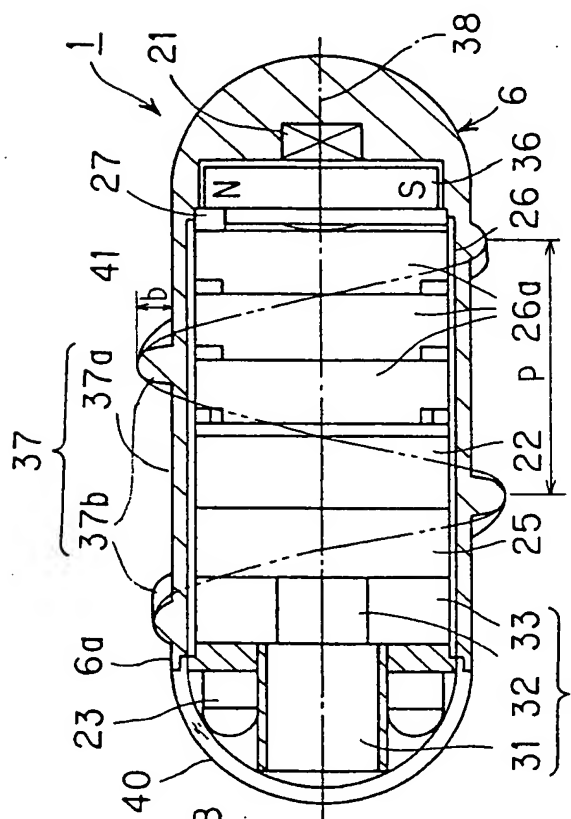


FIG.3C

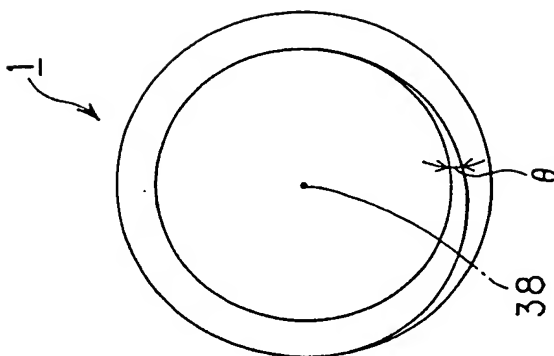


FIG.3D

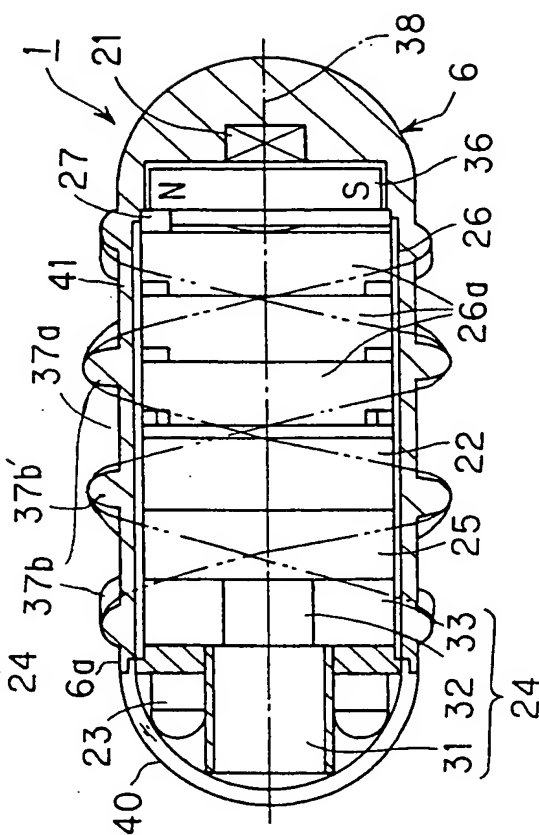


FIG.4

DRIVING PRINCIPLE

EXTERNALLY APPLY ROTATING MAGNETIC FIELD TO PERMANENT MAGNET
 ROTATE MAGNET BY MAGNETIC TORQUE
 ADVANCE BY CONVERTING ROTATING FORCE INTO THRUST WITH SPIRAL STRUCTURE
 CONTROL IN ADVANCING DIRECTION BY CHANGING ROTATING PLANE OF ROTATING MAGNETIC FIELD

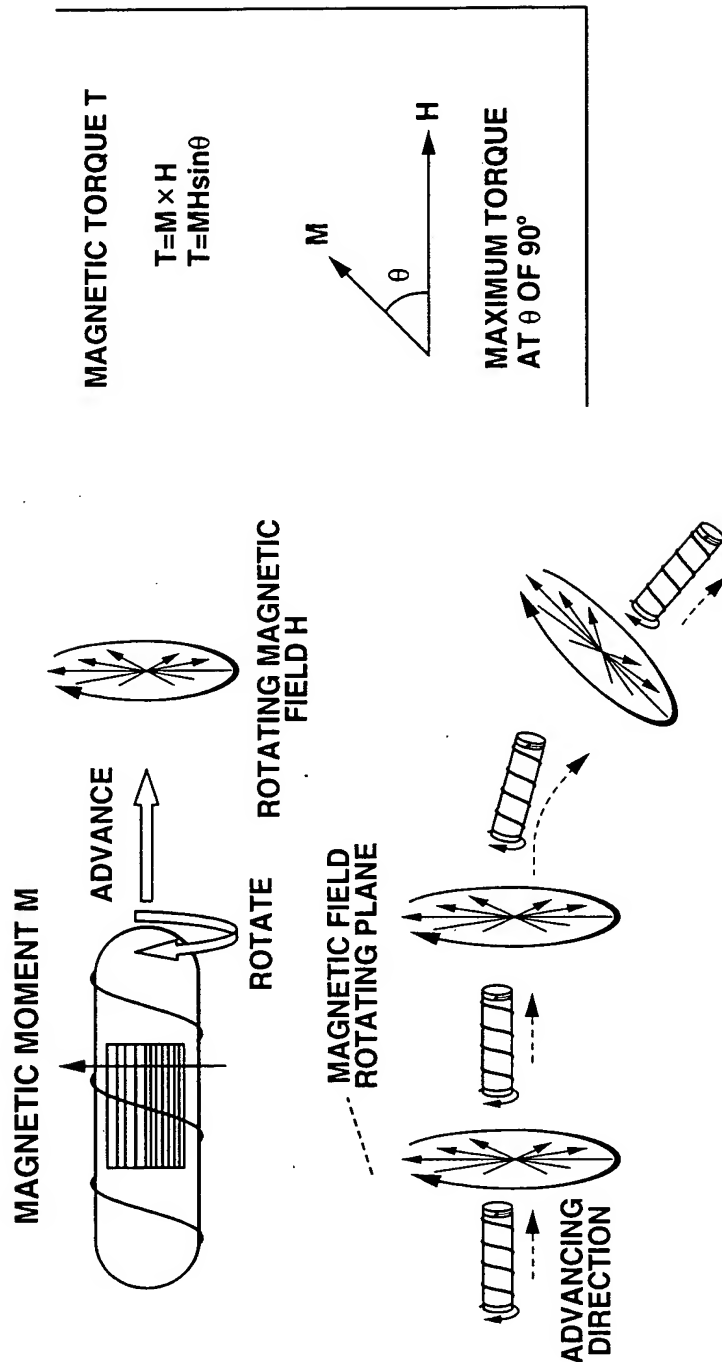


FIG.5A

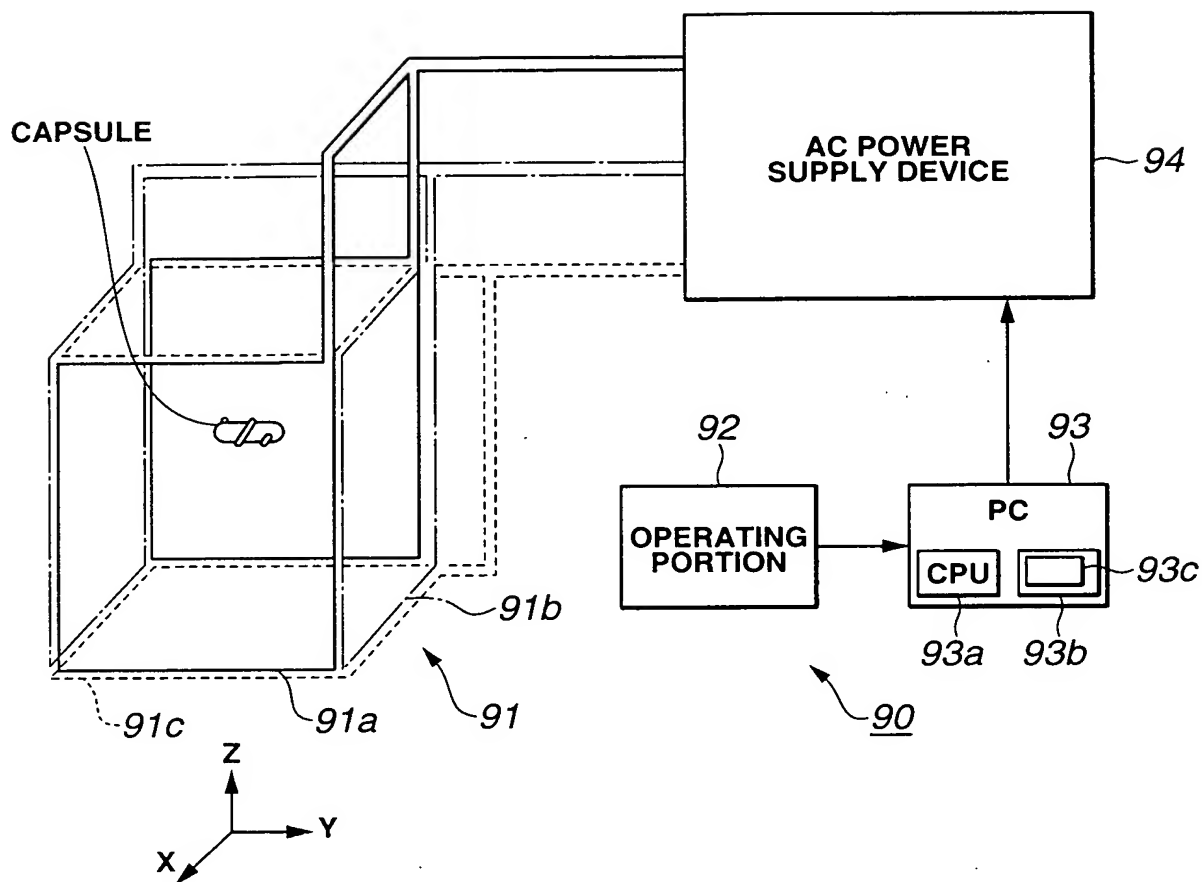


FIG.5B

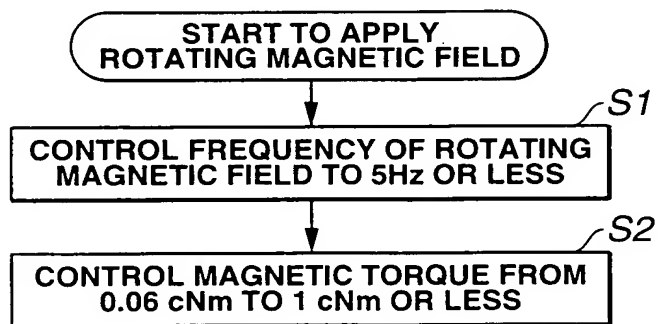


FIG.6

OUTLINE OF THE EXAMINATION

CONVERT ROTATION INTO THRUST WITH SPIRAL STRUCTURE

EXAMINE SPIRAL-SHAPE INFLUENCE ON CAPSULE DRIVING CHARACTERISTIC

- ADVANCING VELOCITY
- LOAD TORQUE

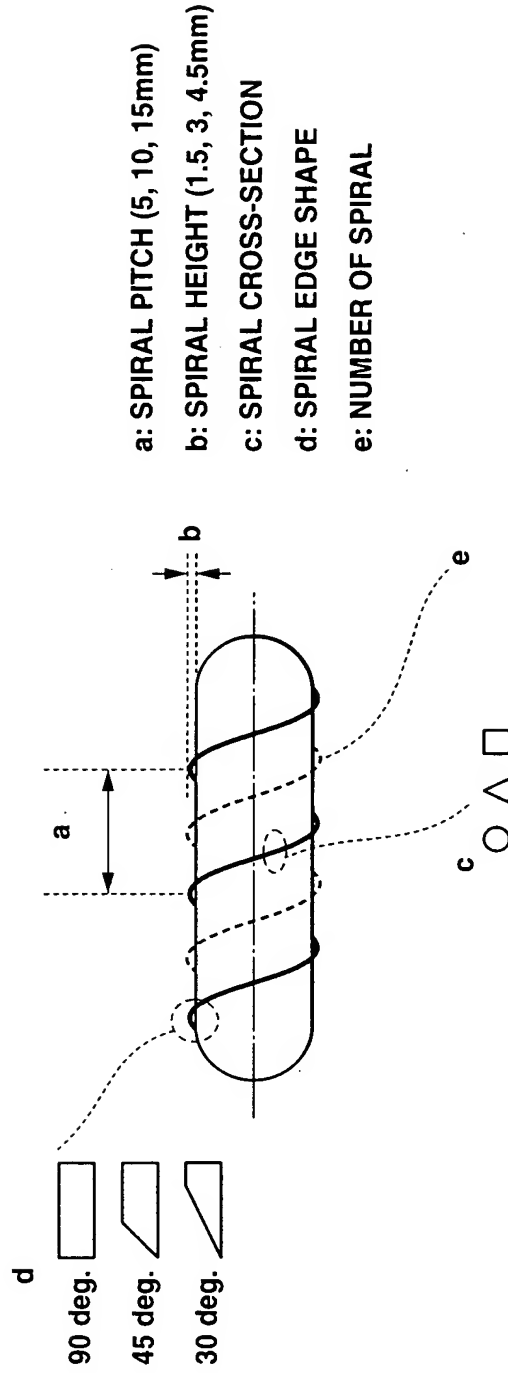
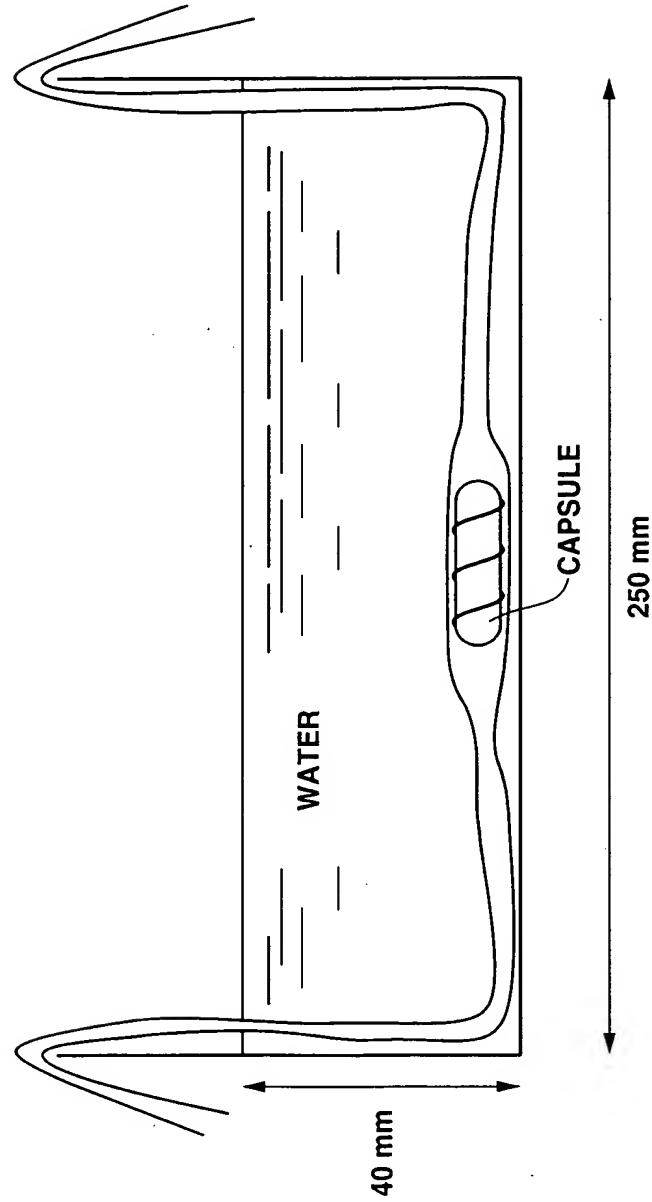


FIG.7

1ST EXPERIMENT -MEASUREMENT OF ADVANCING VELOCITY-

SILICON RUBBER TUBE (THICKNESS: 0.5 mm, WIDTH: 50 mm)

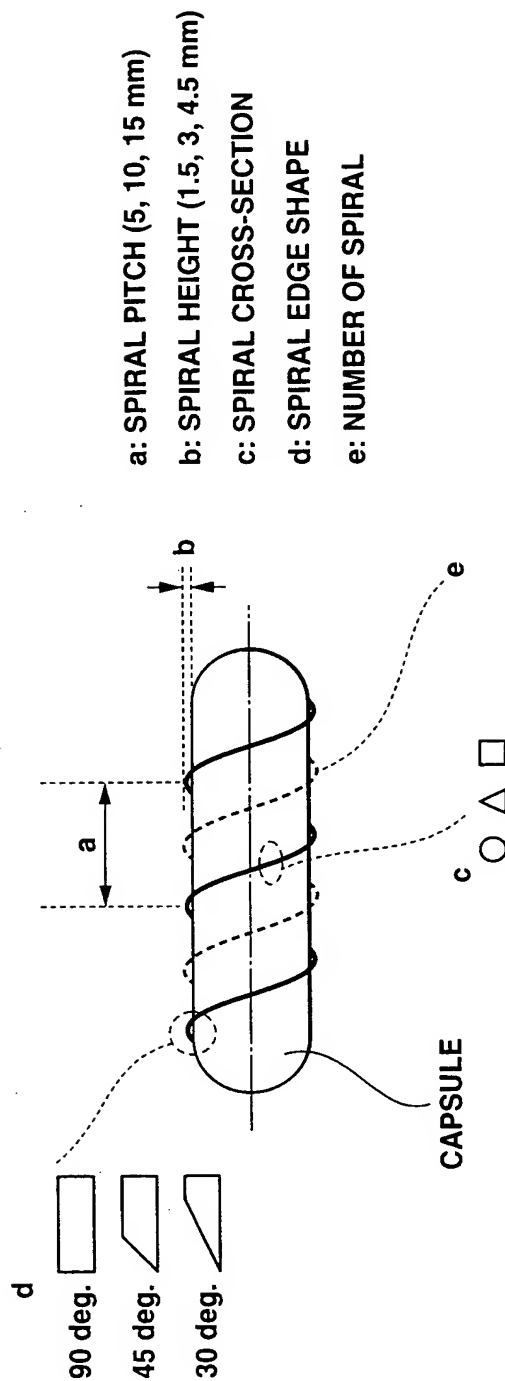


CAPSULE ROTATING FREQUENCY: FREQUENCY OF ROTATING MAGNETIC FIELD
FRICTION LEVEL: QUANTITY OF SILICON OIL IN TUBE
ADHESION DEGREE OF CAPSULE AND TUBE: WATER DEPTH

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FIG.8

SPIRAL SHAPE USED FOR EXAMINATION



DIAMETER: 11 mm, LENGTH: 40 mm

FIG.9
EXPERIMENT RESULT SPIRAL PITCH

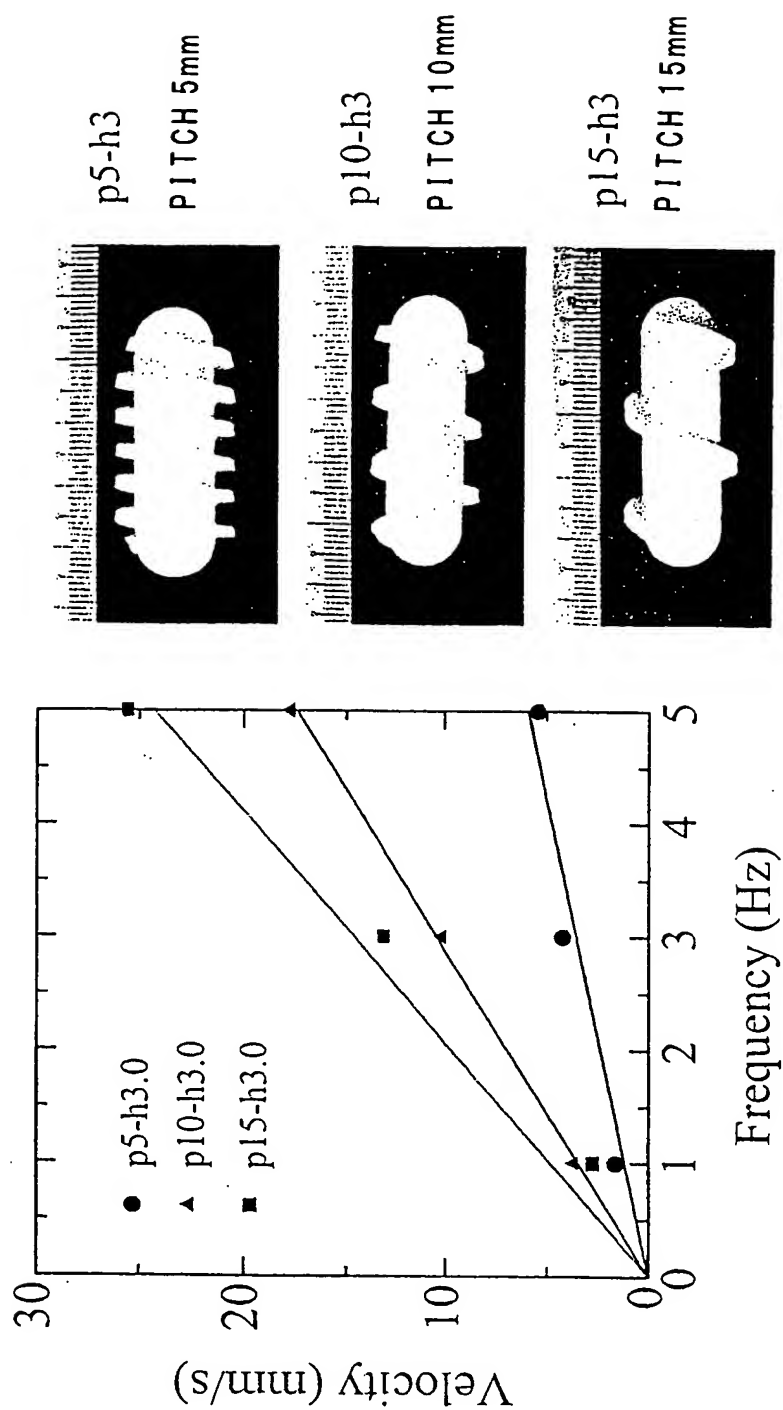


FIG.10

EXPERIMENT RESULT SPIRAL HEIGHT

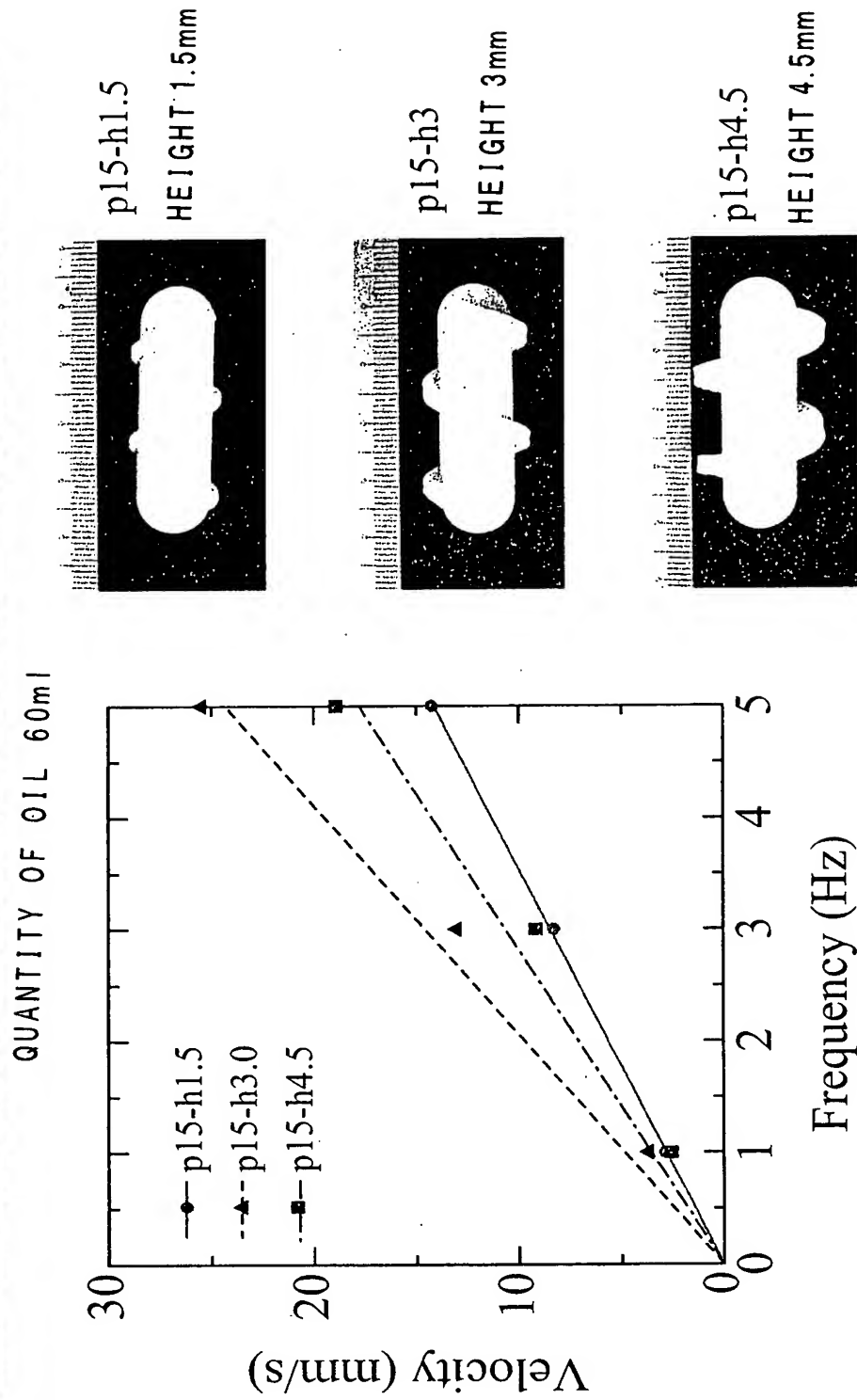
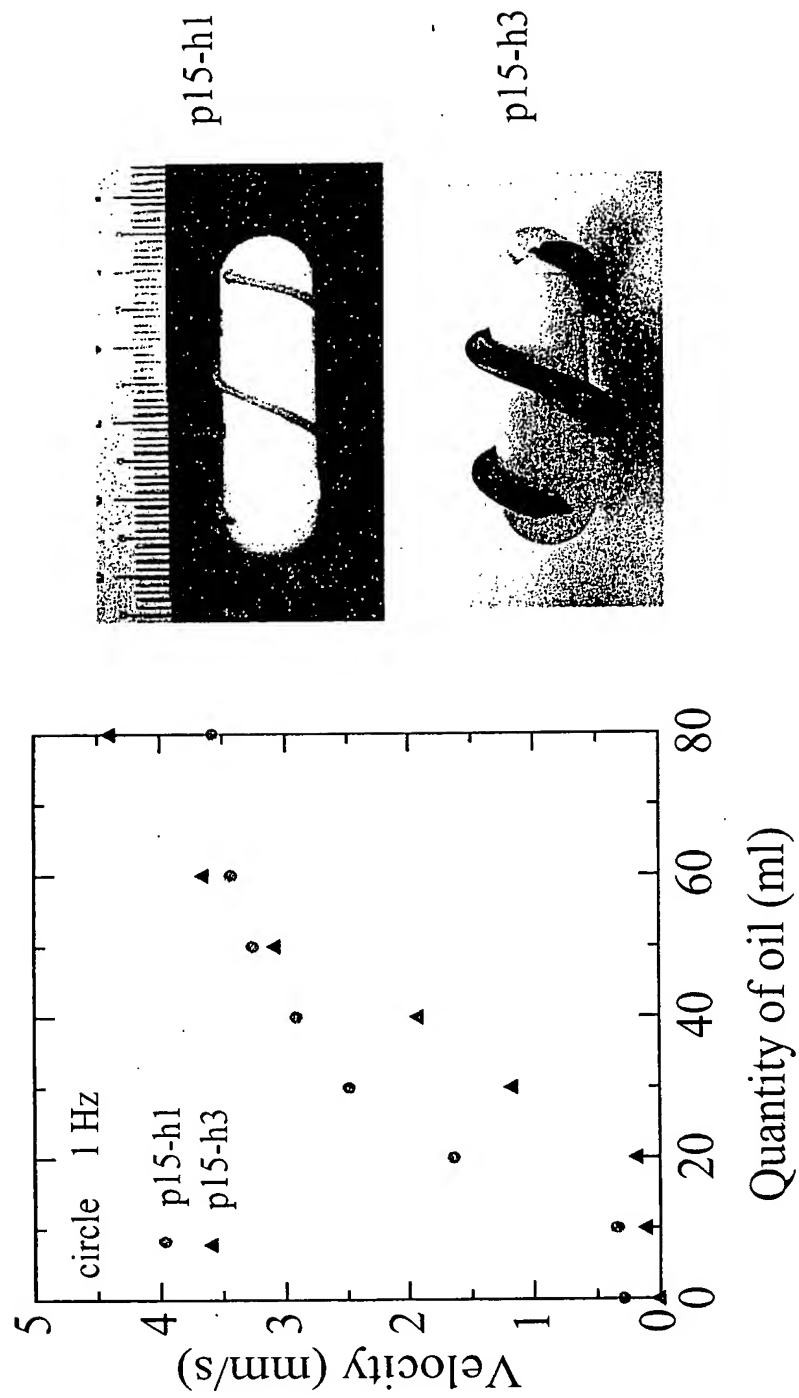


FIG.11

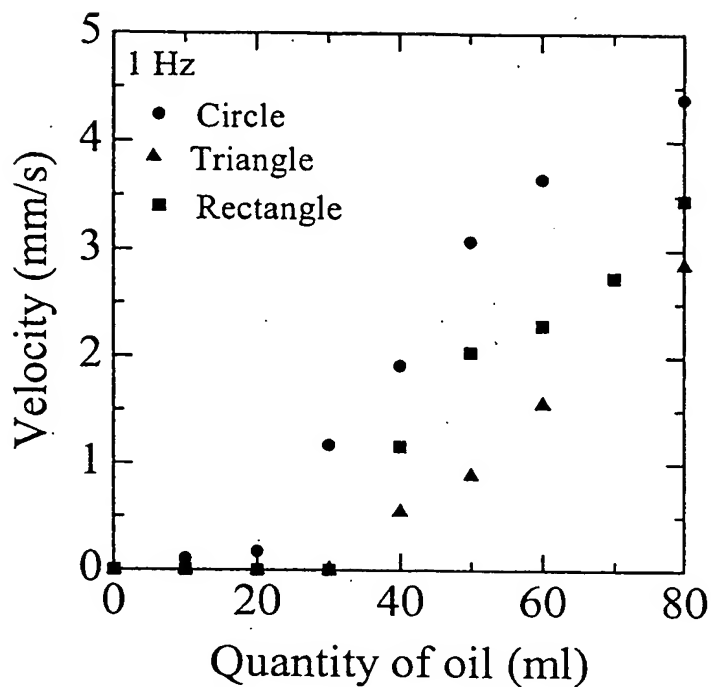
EXPERIMENT RESULT SPIRAL HEIGHT



EXPERIMENT RESULT SPIRAL CROSS-SECTION

p15-h3

FIG.12



EXPERIMENT RESULT SPIRAL EDGE SHAPE

p15-h3, circle

FIG.13

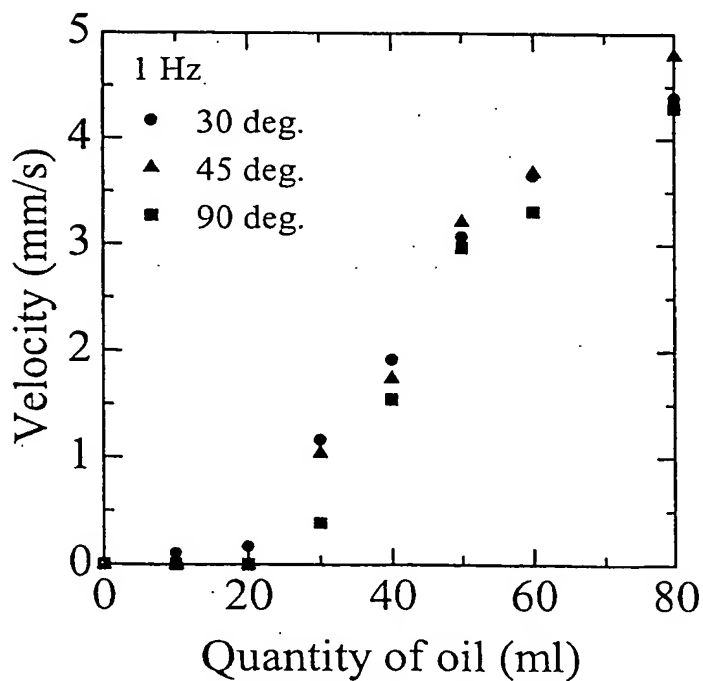


FIG.14
EXPERIMENT RESULT NUMBER OF SPIRAL

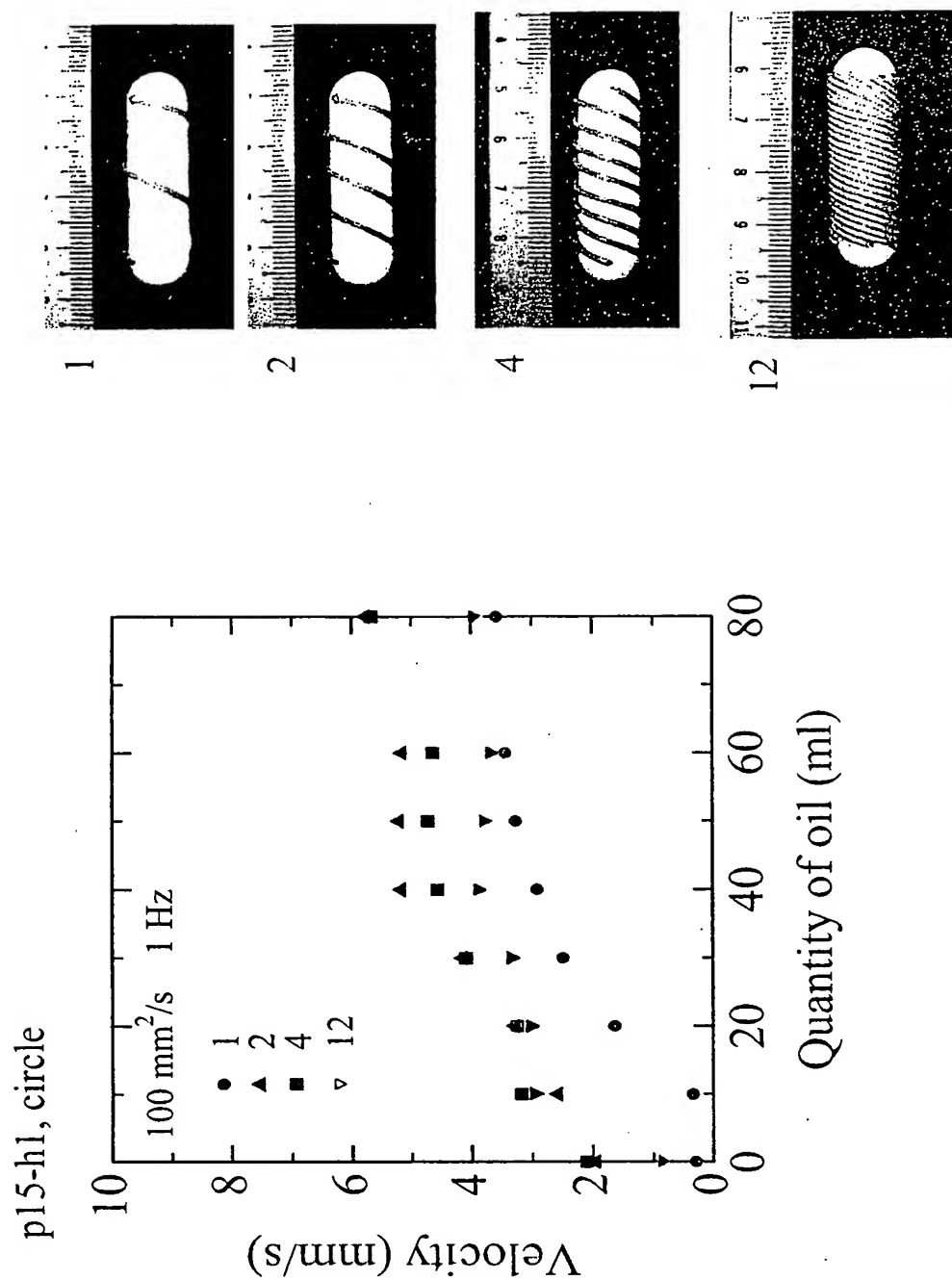


FIG.15A

NUMBER OF TIMES OF ROTATING DEFECT				SPIRAL SHAPE	
TYPE	1Hz	3Hz	5Hz	SPIRAL HEIGHT	SPIRAL PITCH
a	0	0	0	1.5 mm	5 mm
b	0	0	0	1.5 mm	10 mm
c	0	0	0	1.5 mm	15 mm
d	0	0	1	3 mm	5 mm
e	0	0	3	3 mm	10 mm
f	0	1	2	3 mm	15 mm
g	0	3	5	4.5 mm	5 mm
h	0	4	5	4.5 mm	10 mm
i	0	4	5	4.5 mm	15 mm

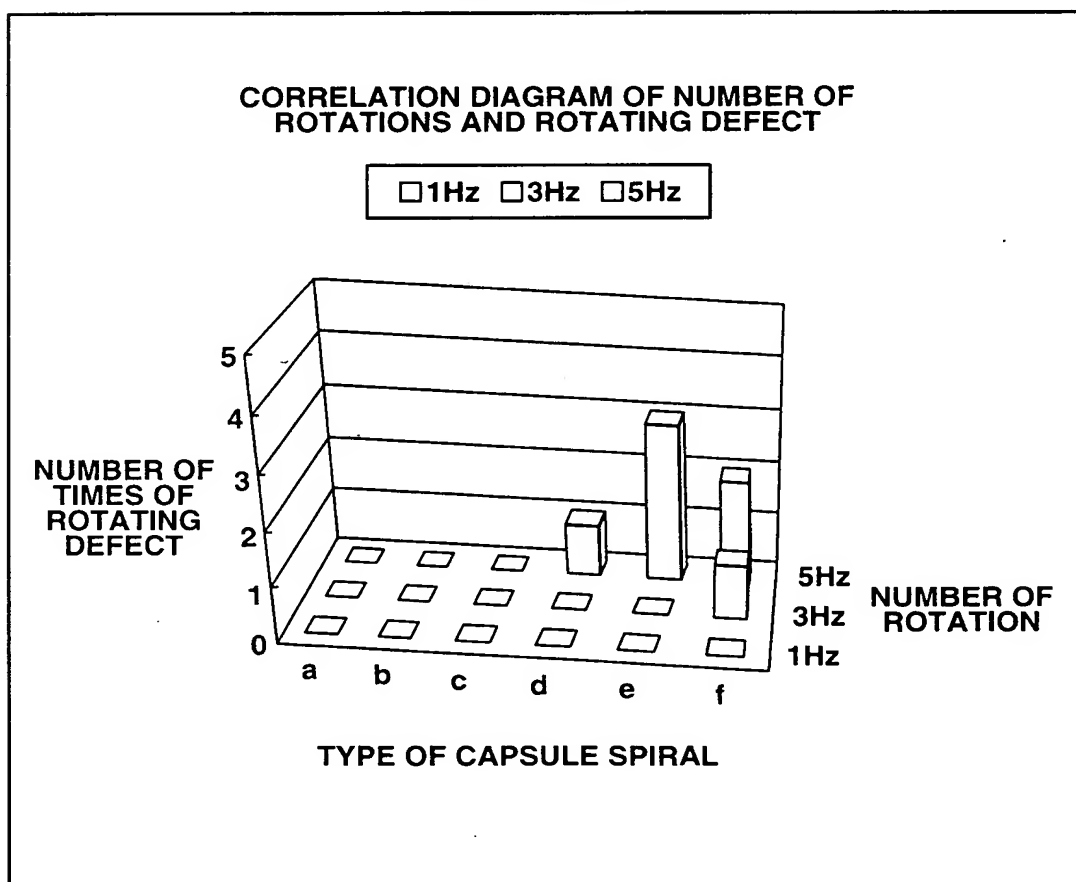
FIG.15B

FIG. 16

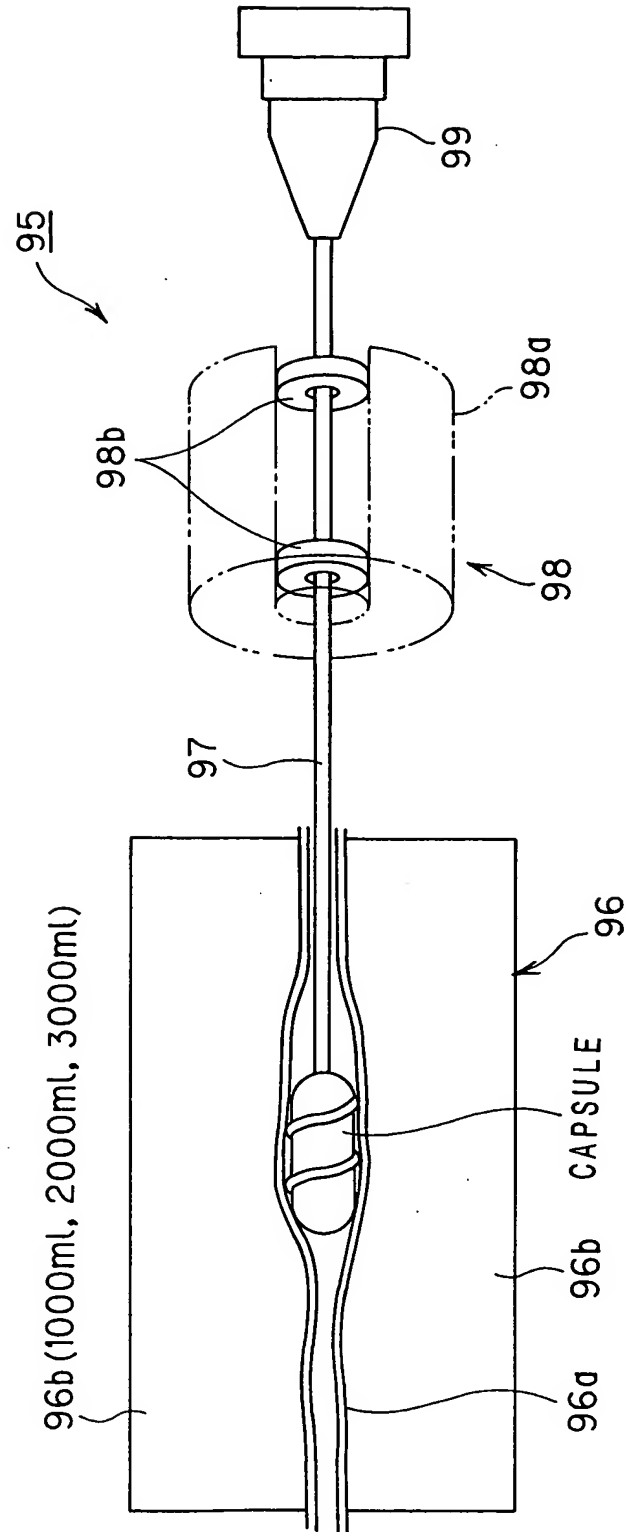


FIG.17A

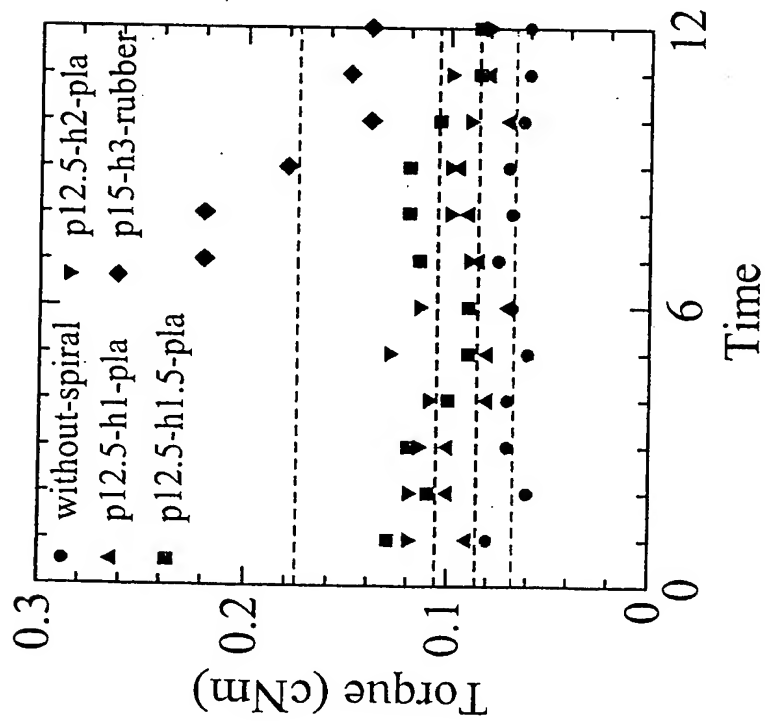


FIG.17B

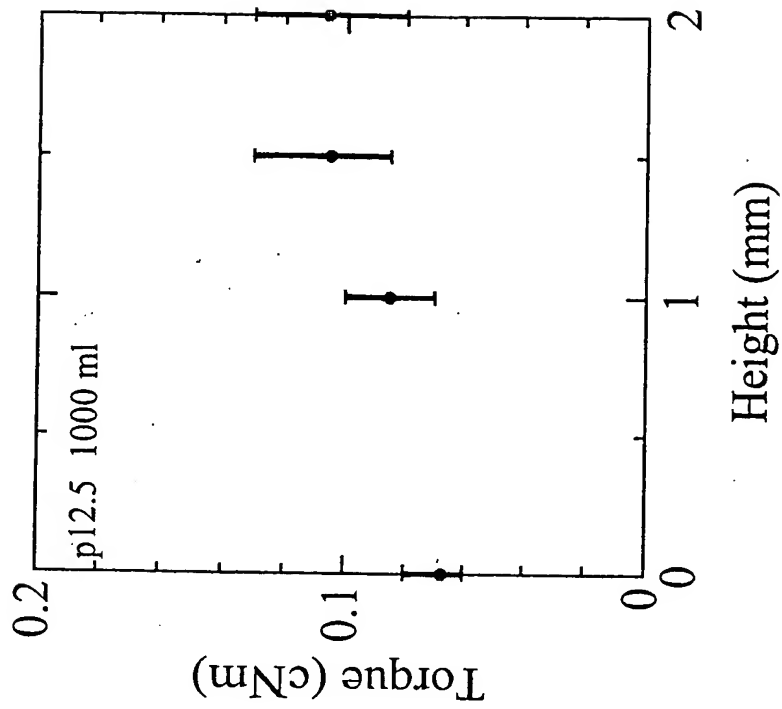


FIG.18A

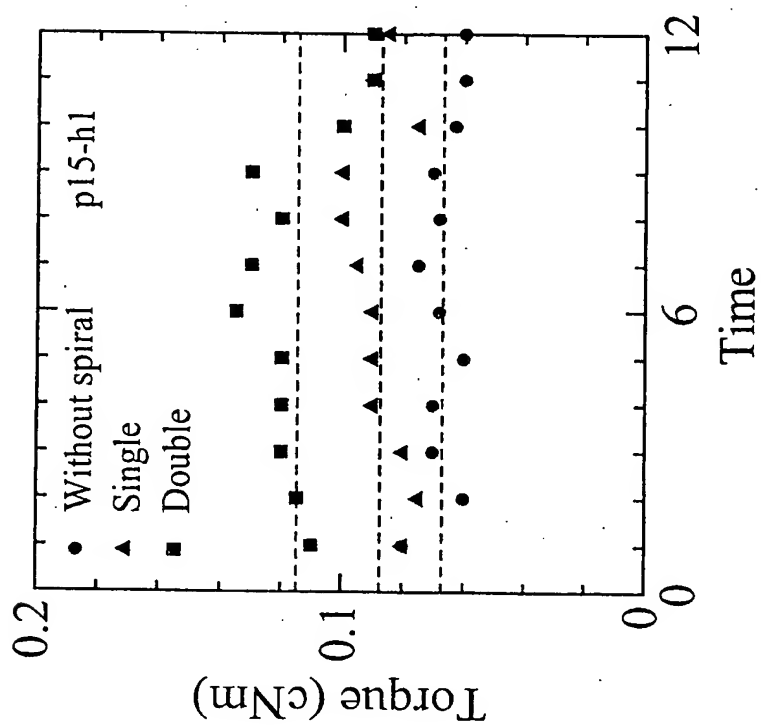


FIG.18B

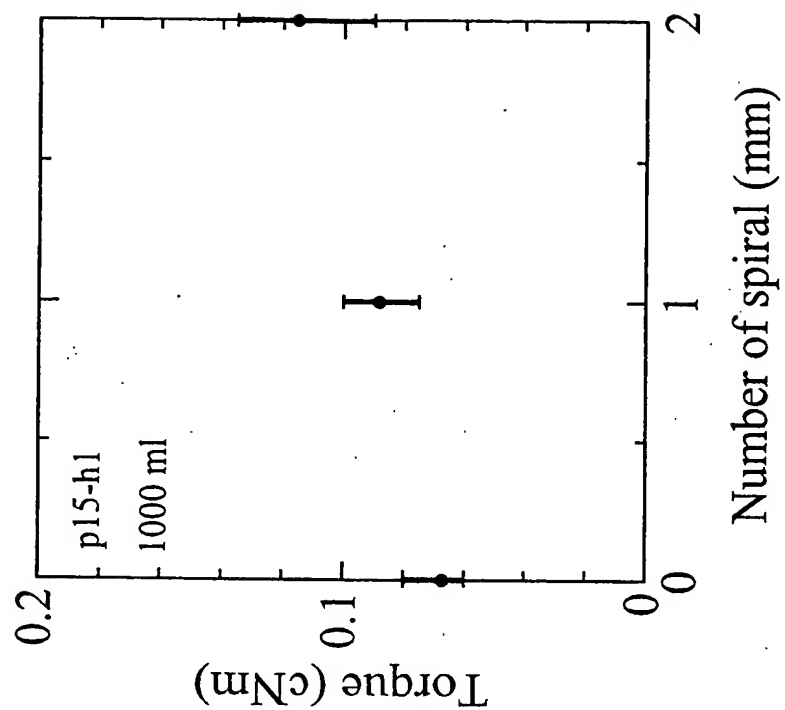


FIG. 19A

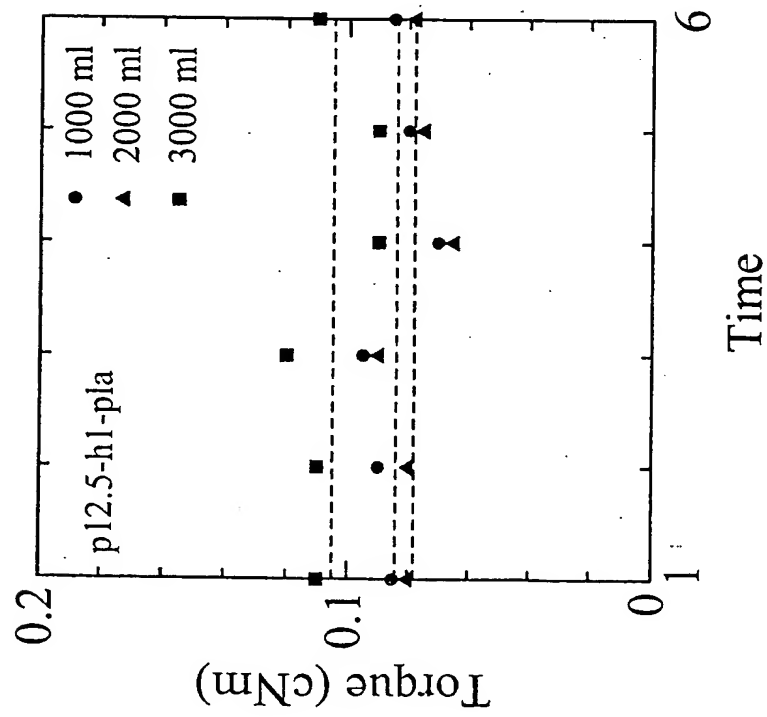


FIG. 19B

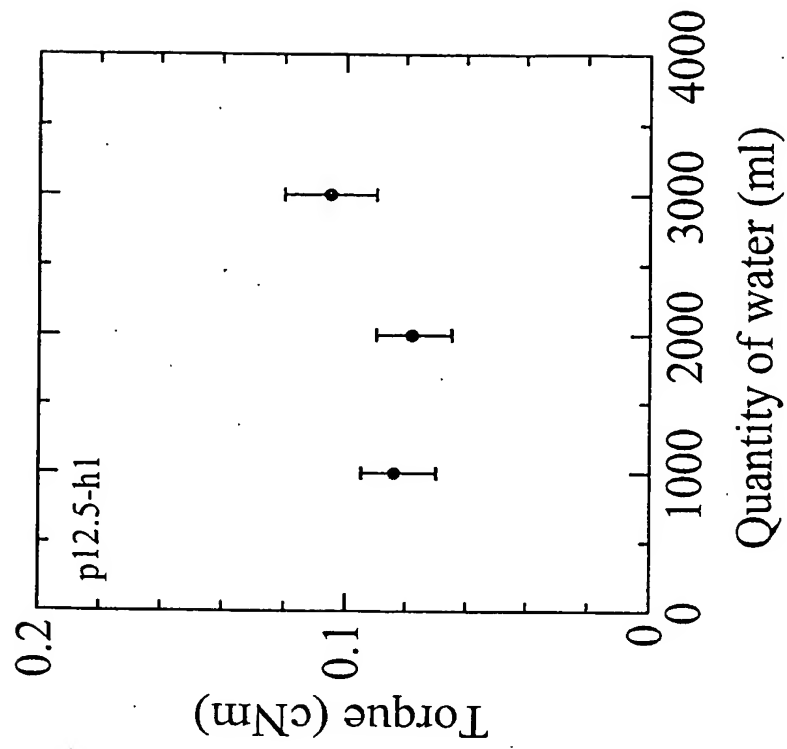


FIG.20

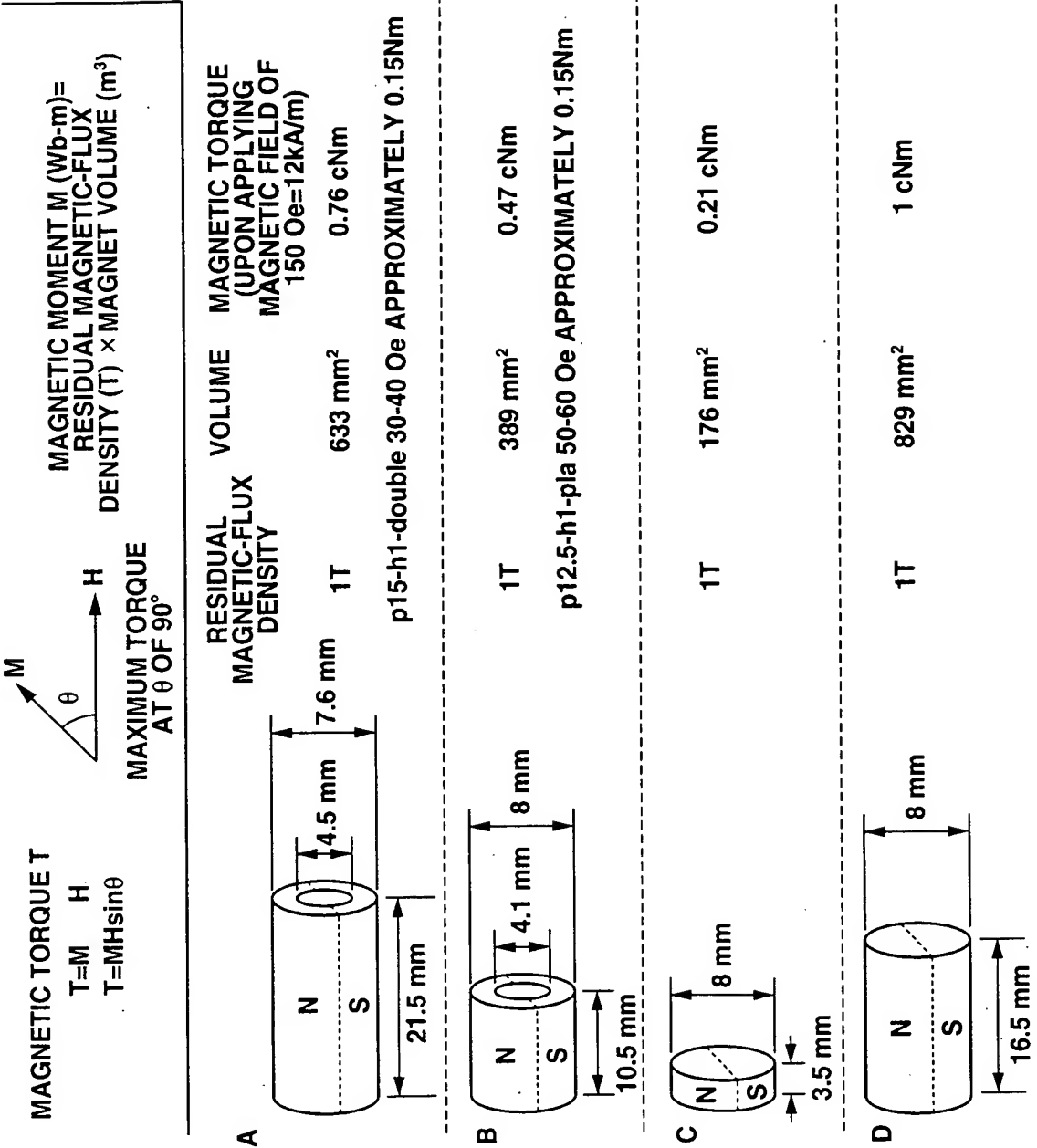


FIG. 21A

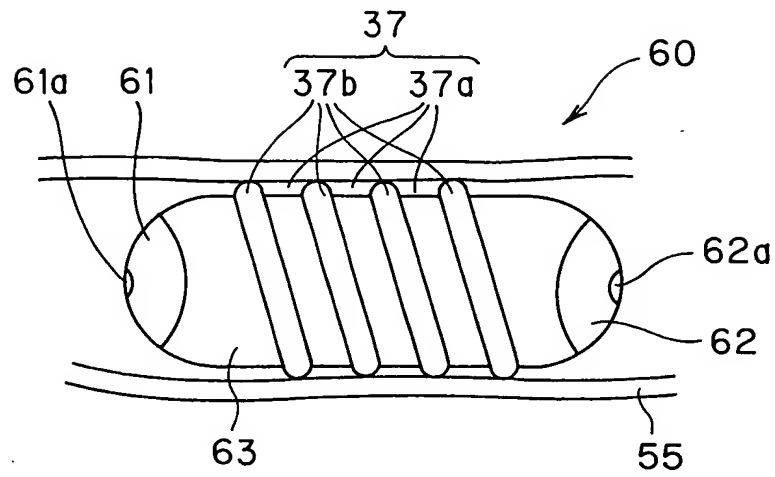


FIG. 21B

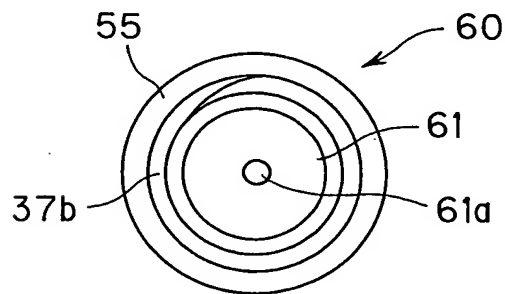


FIG. 22A

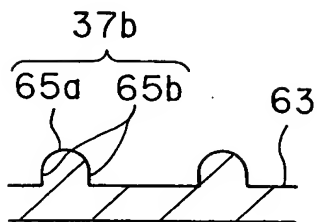


FIG. 22B

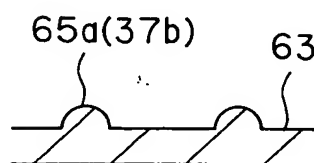


FIG. 22C

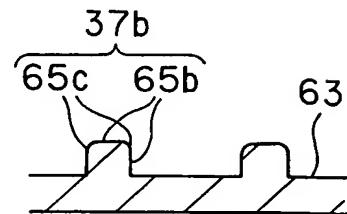


FIG. 22D

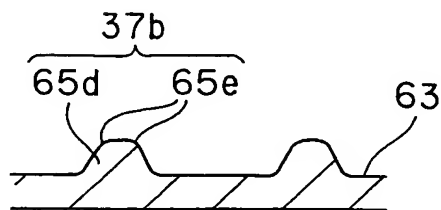


FIG. 23A

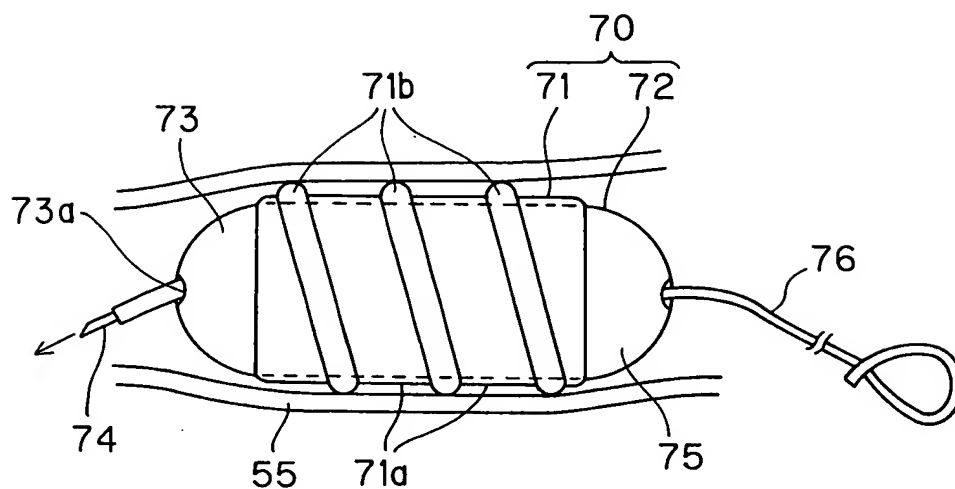


FIG. 23B

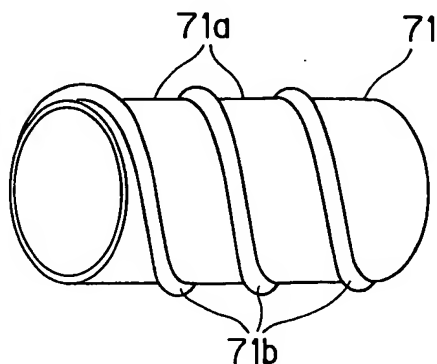


FIG. 26

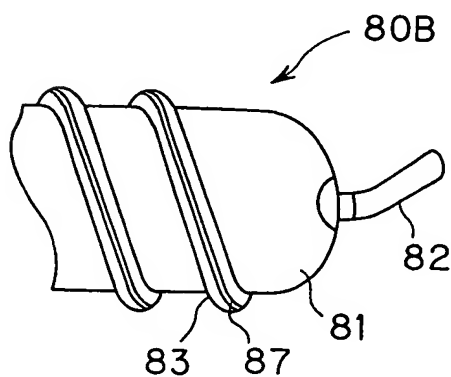


FIG. 27

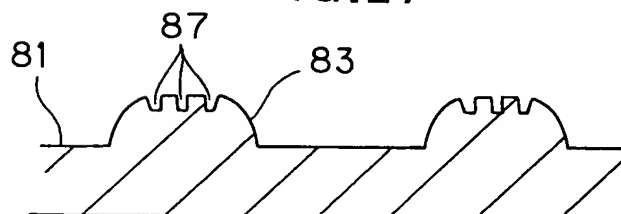


FIG.24

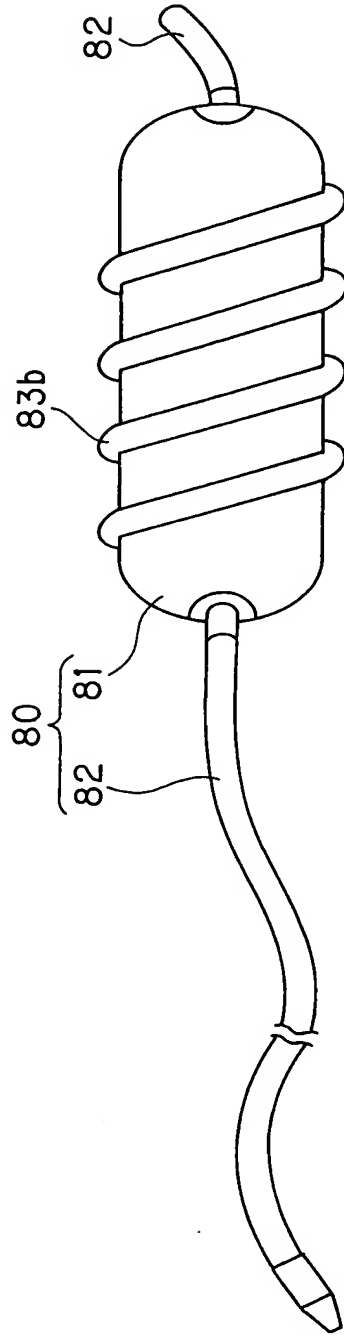


FIG.25

